

discs, did much to elucidate the error in the investigation in question, and to establish the result that if the distribution of coordinates and momenta, which Gibbs now calls "canonical," exists at any instant, it will exist at all future instants. He also gave considerable attention to Boltzmann's minimum theorem, putting the proof into an elegant form.

The theory of errors was a favourite study of Dr. Watson's, and in February, 1891, he read an address before the Birmingham Philosophical Society on the subject. About the year 1894, he was appointed examiner in mathematics in the University of London, but before his term of office had expired, he was compelled to resign owing to a slight paralytic stroke. Recently, owing to ill health, he gave up the rectory of Berkeswell, and migrated to Brighton not long before his death.

Dr. Watson was a representative of the old school of physicists who relied on mathematical reasoning alone, an extreme which would at the present day be as far on one side of the happy mean as the modern experimentalist who builds up mere tables of numerical results is on the other. But his chief work was done at a time when "natural philosophy" meant applied mathematics and not experimental electricity. He was a valued friend to whom the present writer has on more than one occasion been deeply indebted for help and assistance in difficulties.

G. H. BRYAN

#### DR. H. E. SCHUNC, F.R.S.

BY the death of Dr. Edward Schunck, the world has suffered the loss of one of that small band of men of fortune who have devoted themselves to the study of science for its own sake. Edward Schunck was born in Manchester on August 16, 1820, to which town his father, Martin Schunck, had a short time previously removed from Malta to found the business of Schunck, Mylius and Co. This, which was one of the first firms of export merchants started in Lancashire, afterwards became Schunck, Souchay and Co., and as business increased they acquired a dye works in Rochdale. As Martin Schunck was anxious that his son should eventually undertake the management of this works, he sent him to study chemistry under Liebig at Giessen, and at Berlin under Rose and Magnus, but eventually, after some years' trial, the son found that he did not care for the business, and decided to devote himself entirely to research work.

Schunck must, without doubt, be considered the most celebrated worker upon the natural colouring matters, for among these substances there is hardly one to which he has not contributed some fact of considerable importance. His elaborate investigation of madder, commenced in the 'forties and continued to 1894, constitutes an excellent example of the energy and patience which characterised him throughout the whole of his career. With our opportunities of to-day, it is not easy to appreciate fully the labour entailed by his early work in this direction, and though he was most anxious for some younger man to complete his investigation of the yellow substances contained in this plant, no one has yet attempted to face the difficulties of this subject.

It is not possible in this short notice to attempt an account of the numerous researches of his long and active career; on the subject of madder, alizarine and various anthraquinone derivatives, he published more than thirty papers, and his contributions to the chemistry of the lichens, indigo, cochineal and chlorophyll have been of the highest importance. His early predilection for the study of natural products remained with him to the last, and until quite recently he was engaged upon the investigation of the colouring matter which is present in the common blackberry. The difficulty of the many

subjects which he undertook and the elaborate care which he bestowed upon even the smallest operation account for the fact that he was less prolific than many of his contemporaries, but this, on the other hand, has added to the more permanent value of his researches. His dislike for slovenly or untidy work was characteristic of the man, and he frequently stated his inability to work in comfort should more than four glass vessels be upon the bench before him. Shortly after his father's death, which occurred in 1872, he erected his private laboratory at Kersal; this, which is probably the finest in the kingdom, he bequeathed to the Owens College, Manchester.

He was a Fellow of the Royal Society, for some years president of the Manchester Literary and Philosophical Society, a vice-president of the Chemical Society, and, from 1896-7, president of the Society of Chemical Industry, and in 1887, at the Manchester meeting, was president of the Chemical Section of the British Association. In 1898, he received the Dalton medal of the Manchester Literary and Philosophical Society; in 1899, the Davy medal of the Royal Society, and in 1900, the gold medal of the Society of Chemical Industry. He married, in 1851, Judith, the daughter of John Brooke, of Stockport, who survives him, and of his eight children four are now living.

A. G. P.

#### NOTES.

ALL who are interested in scientific progress will welcome the suggestion that the time has now fully arrived for obtaining a public portrait of Lord Rayleigh, whose work and influence have contributed greatly to the advancement of natural knowledge. The eminence of Lord Rayleigh as a scientific discoverer renders such a form of commemoration most desirable, and his public services in many capacities, including that of chairman of the board of the National Physical Laboratory, supply additional reasons. The proposition that steps should be taken to give effect to this project has already received the assent of a number of leaders in the scientific world, and Sir Andrew Noble, Sir Oliver Lodge and Prof. Arthur Schuster have consented to act as joint treasurers for this purpose. It is intended to circulate a first formal list of subscribers after the end of January. It is therefore desired that those who wish to participate will signify their intention to one of the treasurers, by name, at the address of the Royal Society. A meeting of subscribers will be called hereafter to decide upon the next steps to be taken.

THE successful inauguration of wireless telegraphic communication between the United States and England was accomplished by Mr. Marconi at the beginning of this week, which is less than a month after the first message was sent from Cape Breton, Canada, to this country. The distance from the United States station at Cape Cod to Cornwall is about 3000 miles, and is, therefore, greater than that from Cape Breton. The first message was sent from President Roosevelt to the King, and was dispatched by Mr. Marconi himself. The message read as follows:—"His Majesty King Edward VII., London. In taking advantage of the wonderful triumph of scientific research and ingenuity which has been achieved in perfecting the system of wireless telegraphy, I extend on behalf of the American people the most cordial greetings and good wishes to you and all the people of the British Empire. (Signed) THEODORE ROOSEVELT." Later in the day, His Majesty replied in the following terms:—"To the President, White House, Washington. I thank you most sincerely for the kind message which I have just received from you through Signor

Marconi's Transatlantic wireless telegraphy. I sincerely reciprocate, in the name of the people of the British Empire, the cordial greetings and friendly sentiment expressed by you on behalf of the American nation, and I heartily wish you and your country every possible prosperity. (Signed) EDWARD R. We heartily congratulate Mr. Marconi on this fresh success and hope that both the Transatlantic systems will soon be in continuous and useful operation.

As an example of the way in which wireless telegraphy can contribute to the pleasantness, if not to the safety, of travelling by sea, we may call attention to the chess match which took place between two Atlantic liners whilst both were at sea. The *Lucania* started a match by wireless telegraphy with the *Minnetonka*, but after a few moves the communication was broken; later, however, the *Lucania* got into communication with the *Philadelphia*, and a second game was started, which was played out to a finish; the game lasted for three hours, and ended in a victory for the American team over the English. The ships were about fifty miles apart during the playing of the game.

ACCORDING to the *Daily Mail*, Mr. Marconi's system of wireless telegraphy is to be utilised to help forward the through telegraphic communication from the Cape to Cairo. A definite scheme, it is stated, is to be prepared at once, and in the meantime the African Transcontinental Telegraph Company will stop all further extensions from the south. At present, wires have been erected as far north as Lake Tanganyika, and it is expected that the final link between Cairo and Fashoda will be open very soon. Wireless telegraphy, it is hoped, will enable some of the difficulties of the country north of Lake Tanganyika to be surmounted successfully.

MR. QUINTIN HOGG, whose death we regret to record, was one of the few wealthy men in England who are sufficiently interested in educational work to devote their time and means to its advancement. He founded the Polytechnic Institution in Regent Street, London, in 1881, and is said to have spent about 100,000*l.* upon his scheme. The place was designed for 2000 members, but during the first winter the number reached 6800, and there are now between 17,000 and 18,000 members and students of both sexes. For quite twenty years (says the *Times*), Mr. Hogg devoted a large portion of his time, and much of his wealth, to this institution, the object of which was to provide evening teaching, technical training, gymnastics, music and rational amusement to the young men and girls of the commercial class in central London. The success of the Polytechnic was immense, and it provided the model on which all the others in London were formed in later years. No one can say how much the Polytechnic cost him in actual money, but it is believed that 6000*l.* a year is a moderate estimate, up to the date when the institution (with those newly founded on the same model) began to receive grants of public money. Mr. Henry Cunyngame points out in the *Times* that but for Mr. Hogg, London might still be without its polytechnics. It appears that an Act passed in 1883 enabled the Charity Commissioners to schedule the obsolete charities of the City of London and devote them to education. The Commissioners' attention was called to the Regent Street Polytechnic, "and ultimately on this model there arose that group of polytechnics which accommodate in London over 30,000 boys, and stand like forts in the sea of London temptations to youthful dissipation, ignorance and idleness."

THE article which Dr. A. R. Wallace contributes to *Black and White* of January 17, on his relations with Darwin in connection with the theory of natural selection, is a historical document of great scientific interest. Dr. Wallace was intro-

duced to Darwin in the insect-room of the British Museum in 1854. While living in Borneo in 1854, Dr. Wallace wrote a paper "On the Law which has Regulated the Introduction of new Species," which was published in the *Annals of Natural History* in the following year. Hearing that Darwin was preparing some work on varieties and species, Dr. Wallace sent him a copy of his paper and received a long letter in reply, but no hint was given by Darwin of his having arrived at the theory of natural selection. Darwin had, however, actually written out a sketch of his theory in 1842, and in 1844 this sketch was enlarged to 230 folio pages, giving a complete presentation of the arguments afterwards set forth in the "Origin of Species." Dr. Wallace arrived at the idea of the survival of the fittest as the operating cause in evolution in 1858, and immediately sent the outlines of this theory to Darwin, who brought the communication before Sir C. Lyell and Sir Joseph Hooker, and urged that it should be printed at once. Upon their advice, however, he consented to let an extract from his sketch of 1844 be presented to the Linnean Society with Dr. Wallace's paper on July 1, 1858. "In conclusion," Dr. Wallace says, "I would only wish to add that my connection with Darwin and his great work has helped to secure for my own writings on the same questions a full recognition by the Press and the public; while my share in the origination and establishment of the theory of natural selection has usually been exaggerated. The one great result which I claim for my paper of 1858 is that it compelled Darwin to write and publish his 'Origin of Species' without further delay." The story reflects great credit upon both Dr. Wallace and Darwin, and many naturalists will be glad to read it. We congratulate Dr. Wallace upon having presented the world with such an interesting record after attaining his eightieth birthday.

THE death is announced of Prof. Sirodot, correspondant of the section of botany of the Paris Academy of Sciences, and of Prof. Charles J. Bell, professor of chemistry in the University of Minnesota.

REUTER'S agency reports that a sharp shock of earthquake of vertical direction and lasting two seconds was experienced at Davos on Monday afternoon.

PROF. J. H. LONG, of Northwestern University, has been elected president of the American Chemical Society, in succession to Prof. Ira Remsen.

THE report of the committee appointed by the Board of Agriculture to consider the question of forestry as regards Great Britain has been issued as a Blue-book.

A MANCHESTER telegram states that Dr. Schunck's bequest to Owens College, Manchester, does not include an endowment of 40,000*l.* as reported. It is confined to his valuable laboratory and laboratory buildings.

PROF. GUSTAV BISCHOF, formerly professor of technical chemistry at Anderson's College, Glasgow, died in London, on January 13, in his sixty-ninth year. He was known as an analytical chemist, principally in connection with water analysis.

MR. THOMAS SUTTON TIMMIS, of Allerton, near Liverpool, has vested in trustees a sum of 10,000*l.* to initiate systematic research into the origin and cure of cancer. The investigations will be conducted at the Liverpool Royal Infirmary and the new laboratories of experimental medicine in University College, Liverpool.

A CENTRAL NEWS telegram states that the tests of the new 16-inch gun, just mounted at Sandy Hook, took place on January 17 with complete success. Three shots were fired, one with the full service charge of 640 lb. of smokeless powder, said

to be the largest yet fired, and a projectile weighing 2400 lb. The shot struck the sea three miles from shore. The gun will have a range of twenty miles.

THE Paris correspondent of the *Times* states that at a meeting of the Academy of Moral and Political Sciences on January 17, the incorporation of the British Academy with the International Association of Academies was agreed to unanimously. Lord Reay, the first president of the British Academy, who is a correspondent of the Institute, expressed his thanks for the decision.

WE learn from *Science* that the Carnegie Institution of Washington has made a grant to the Marine Biological Laboratory, and now has at its disposal twenty tables in the laboratory at Woods Hole, Mass., for the season of 1903. These tables are intended for the use of persons engaged in original research in biology, and carry with them the right to be furnished with the ordinary supplies and material of the laboratory.

ACCORDING to the *Daily Mail*, Mr. Edward Baily, of Penzance, formerly of Mansfield, Notts, has presented to the Mansfield Town Council, in trust for his native town as a nucleus of a museum, a large and valuable collection of natural history specimens and scientific apparatus, collected by him during the past twenty years.

THE protection of the coasts from the inroads of the sea has become a matter of great importance in Norfolk and Suffolk. A meeting to consider what action should be taken was held at Norwich on Saturday last, many representatives of local bodies and public companies being present. Sir Samuel Hoare, M.P., wrote that he would like to see the Government appoint an experienced commissioner for Norfolk and Suffolk, or better still, one for each county, to report on the present encroachments, after some months' work and experiments, and to have under him officers in charge of certain portions of the coast who should keep records of daily, weekly and monthly observations. The following resolutions were adopted:—(1) "That the inroads of the sea upon the coasts of Norfolk and Suffolk have increased so much as to become a national danger; that the existing powers of the local authorities and the financial resources at present available are insufficient for the construction and maintenance of adequate works of sea defence, and that the time has arrived when measures should be taken with the least possible delay to bring the subject, by petition or otherwise, to the notice of His Majesty's Government with the view of obtaining a Government inquiry, and some relief towards, or allowance in respect of, the cost of maintenance of such protection works." (2) "That a committee be formed, consisting of the members appointed by each of the local authorities concerned, with power to add to their number, together with their representatives in Parliament, to consider the best means for giving effect to the foregoing resolution, and, if considered advisable, to confer with other districts in the country similarly affected, and to report thereon to the respective local authorities, and that when necessary another conference be convened upon the subject."

A NEW system of telegraphic time-signals has been adopted by the U.S. Naval Observatory, Washington, and has many advantages over the method followed in this country. Instead of sending one signal at noon, as is done here for the noon signal from Greenwich, a series of signals, beginning at five minutes before noon and ending at noon, is sent out from the Observatory. This series agrees with that in use on the Pacific coast, so that the same system is now employed throughout the United States. During the interval over which the time-signals extend, every tick of the transmitting clock is signalled electrically, except the twenty-ninth second of each minute, the

last five seconds of the first four minutes and the last ten seconds of the last minute. After this final break of ten seconds' duration, the noon signal is given. The electric connections of the transmitting clock at the Observatory emit certain sounds which can be easily distinguished by anyone listening to a sounder in a telegraph or telephone office. It is thus possible to recognise, by means of the breaks in the record, the middle and end of each minute, and especially the end of the minute which terminates at noon. As the signal is seldom in error to an amount greater than one- or two-tenths of a second, and electric transmission over a continuous wire is practically instantaneous, the series of noon signals provide a convenient means of accurately regulating clocks to standard time throughout the United States. The system is much to be preferred to that of sending a single signal at noon, as is done in this country for Greenwich time.

DURING the greater part of the week ended January 17, the British Isles were under the influence of an area of high barometric pressure, and experienced very cold northerly and easterly winds, the temperature being much below the average. The *Weekly Weather Report* just issued by the Meteorological Office states that the temperature was as much as 10° below the normal in the midland counties, 9° in Scotland W. and the western half of England, and between 8° and 6° in other parts of the kingdom. The highest of the maxima were recorded, as a general rule, towards the end of the period, and ranged from 50° in the Channel Islands and 49° in Ireland S. to 40° in Scotland E., England N.E. and the midland counties. At inland stations, the daily maxima during the week were frequently below 32°, and at Lairg on January 13 the highest reading was no more than 20°. The lowest of the minima were mostly recorded about the middle of the week. In Scotland N. (at Braemar on January 13), the screened thermometer registered a minimum of 1°, and on the following day, that at Lairg, Scotland N., fell to 6°. Elsewhere, however, the minima ranged from 12° in England N.W. and 13° in the midland counties to 20° in Ireland S. and 26° in the Channel Islands. In the neighbourhood of London, the greatest cold during the present winter, 24° in the screen, occurred on the night of Thursday to Friday, while at Greenwich the exposed thermometer on grass registered 12°. On Saturday a sudden thaw set in with snow and rain, which froze on touching the cold ground and formed a layer of ice known as silver thaw, owing to which very many accidents occurred to pedestrians.

In his presidential address to the Institution of Engineers and Shipbuilders in Scotland, reported in the *Transactions*, Mr. William Foulis stated that several important changes had been made. The number of members of council was increased, the class of students was placed on a more satisfactory basis and a class of associate members was formed. The most important points for future improvement were, first, that a member of council should preside at students' meetings; secondly, that a research committee should be formed; and, thirdly, that more and better accommodation should be provided for the Institution and especially its library.

A MATHEMATICAL investigation of the theory of railway brakes is given by Prof. A. Sommerfeld in the *Denkschrift* of the Technical College at Aachen, published in connection with the Düsseldorf Exhibition. Prof. Sommerfeld divides the action of the brake into three phases, the first characterised by pure rolling of the wheels on the rails, the second by a mixture of rolling and slipping, while in the third phase the wheels slip along the rails without rolling. A consideration of the three phases leads to an explanation of the property that an increase of brake pressure sometimes reduces the efficacy of the brakes



instead of increasing it. In the investigation, account is taken of the dependency of the coefficient of friction on the velocity based upon experimental determinations.

SOME estimates of the stresses in the riveted attachments in ships are given in the December number of the *Transactions* of the Institution of Engineers and Shipbuilders in Scotland by Dr. J. Bruhn. Taking ships of various dimensions, the author calculates the stresses at the gunwale amidships from the ordinary theory of bending, and the stresses in the rivets are obtained from the assumption that the stress is increased above that on the solid plate in proportion to the reduced sectional area. By drawing curves showing the relation between the stresses so calculated and the lengths of the ships, it is shown how the stresses on the edge riveting are being rapidly increased by the increase in the size of vessels and also by the tendency to let full-formed vessels proceed to sea in light or comparatively light conditions, particularly when water ballast has been added. Practically the only way of reducing the stresses is by increased rivet area. In some cases, this may be obtained by closing up the spacing of the rivets, but eventually, as the size of the ship increases, an additional row of rivets must be fitted.

AN interesting report on the plasticity of clays is presented to the *Bulletin de la Société d'Encouragement* for November 30, 1902, by M. B. Zschokke. Of the various theories of plasticity, the author attaches much importance to that of A. Rejtö, according to which the peculiar properties of clay are due in the main to the fact that the cohesion of its particles exceeds the internal friction. A number of experiments are described in which the tenacity of various samples of clay was tested by submitting cylinders to longitudinal traction. One remarkable result of these experiments is that the elongation previous to rupture is greater when the traction is applied rapidly than when it is applied slowly.

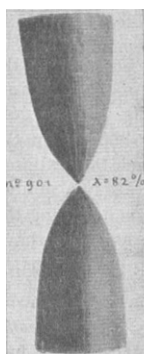


FIG. 1.



FIG. 2.

With rapid tractions, the diagrams obtained show that the separated portions taper to sharp, almost conical, points (Fig. 1), whereas with tractions applied gradually to the same samples of clay the breakage seems to take place abruptly before the constriction at the middle of the bar has become great (Fig. 2). This

remarkable property is the exact opposite of that met with in the majority of substances, such as metals. The attempt to explain the phenomena has led M. Zschokke to a study of the microscopic structure of different samples of clay, in illustration of which several diagrams are given. Finally, the author defines plasticity as that property of a body, possessing as great a cohesion as possible, of undergoing, under the action of external forces, very great permanent deformations without the deformed body exhibiting any change in its cohesion relatively to the original body. Plasticity, it is pointed out, depends largely on the absorbing power of the clay and its attraction for the absorbed water, and the latter depends partly on the size of the particles and partly on the physical or chemical affinity between these particles and the water.

THE *Annales de l'Observatoire Astronomique* of Moscow (vol. iv., second series), which is published under the direction

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of Prof. W. Ceraski, contains some valuable contributions to astronomy. The volume opens with the reductions of the meridian observations made by M. Modestow of stars in the zone  $0^{\circ}$  to  $+4^{\circ}$  declination, the object being to determine the positions of all stars down to magnitude 8. This is followed by three contributions by M. S. Blakjo on the calculation of occultation of stars by the moon, containing tables to facilitate reduction, observations of the Leonids in 1897, 1898 and 1899, and of the planet Mars in 1896-1897 (with plates). Prof. Ceraski gives a valuable photometric study of a certain number of stars in the constellation of Coma Berenices, and adds a process plate showing a portion of the region.

MR. H. A. BRYDEN contributes to the *Fortnightly Review* for January an article on the decline and fall of the South African elephant. It appears that the wild elephant has now practically ceased to exist south of the Cunene and Zambesi rivers. About the year 1830, elephant hunting in Cape Colony was prohibited by the British Government. Since that time, remaining herds have been carefully protected, and they still roam the dense jungles of the Knysna Forest and the Addo Bush in large numbers. It is a curious illustration of what a little timely preservation will do for wild creatures that often within a few miles of Port Elizabeth and Mitenhage there are strong troops of these animals, while one may travel elsewhere fifteen hundred miles up country and not succeed in finding a single wild elephant.

IN his recent report on the trade of Würtemberg for the year 1901 and part of 1902, Dr. F. Rose, H.M. Consul at Stuttgart, refers to the heavy fall in the price of carbolic acid owing to the manufacture of this substance by a synthetic process. The commencement of the manufacture of synthetic carbolic acid in Germany was, the report points out, the direct result of the prohibition of the export of carbolic acid from the United Kingdom in January, 1900. In a former report, Dr. Rose, in the course of some remarks on the production of synthetic carbolic acid, said that "the high prices for phenol, caused by the prohibition and the low price of benzol in Germany, were instrumental in giving a great impetus to the endeavours of German chemists to discover a cheap working method of preparing phenol synthetically from benzol, and thus rendering Germany independent of the export from the United Kingdom. The danger to the British export trade of carbolic acid then foreshadowed has now become an actual fact."

IN a reprint of a pamphlet from the *Humane Review* entitled "The Fate of the Fur-Seal," the author, Mr. J. Collinson, directs attention to the cruelties connected with the driving and slaughter of these animals on the Pribilofs, as well as to the evils of pelagic sealing.

A RECENT fasciculus (No. 1310) of the *Proceedings* of the U.S. National Museum is devoted to materials for a monograph of the North American insects of the order Thysanoptera. At the conclusion of the memoir, the author, Mr. W. E. Hinds, discusses the phylogeny of the different sections of the group.

WE have received a copy of a second lecture on "Thoroughbreds and their Grassland," by the Rev. E. A. Woodruffe-Peacock, forming No. 2 of the *Rural Studies Series*, in which the nature of soils and the best kinds of grass with which to sow them are discussed.

THE *American Naturalist* for December contains an important paper, by Prof. A. W. Grabau, on the morphology and growth of the gastropod shell, with especial reference to the protoconch, or embryo-shell. Attention is called to the fact that several of the modern limpet-like shells, such as *Acmaea* and *Crepidula*, have coiled protoconchs, whence it is inferred that this type of shell is probably not, as might at first sight

have been supposed, primitive. The subject is largely treated from the palæontological aspect.

CAPTAIN BARRETT-HAMILTON has sent us a copy of his paper, from the November number of the *Zoologist*, on the origin of sexual dimorphism and nuptial weapons and ornament. It is stated that the recent investigations into the life-history of the salmon, published by the Scotch Fishery Board, confirm the author's view as to the setting free of proteids and other compounds in the breeding salmon, and their transference to various parts of the body.

As is well known, the typhoid bacillus produces little or no toxin in artificial cultivations, and all attempts to obtain a typhoid antitoxin have hitherto proved failures. Chantemesse, however, by growing the typhoid bacillus in a special culture medium prepared from spleen and bone marrow, claims to have obtained a toxin with which he has been able to immunise horses and to prepare a typhoid antitoxin. Of 179 cases treated with the latter, seven died, a case-mortality of only 3.7 per cent., whereas of 1192 cases treated during the same period on general principles, 286 died, a case mortality of 19.3 per cent. (*La Presse Médicale*, December 24, 1902, p. 1227).

THE function of the flagellated body of the malaria parasite was for a long time a disputed question. In 1898, MacCallum found that in the Halteridium, a malaria-like parasite of birds, there were two varieties of the parasite, a granular and a non-granular, and he observed that it was only the latter that developed flagella. He had the good fortune to observe a flagellum from a non-granular parasite enter and fuse with a granular one, and therefore concluded that the flagellum was a fertilising element. It was suggested that the same would hold good for the malaria parasite, and MacCallum stated that he had actually observed this to be the case. Dr. Moore, of the University of Texas, announces that he has been fortunate enough to observe the phenomenon in a case of æstivo-autumnal fever. A hyaline or non-granular body was seen to be in active movement, and in a moment four active flagella were extruded. One of these became separated and happened to come in contact with a granular body, and after several attempts entered into this and became fused with it (*Johns Hopkins Hosp. Bull.*, October, 1902, p. 235).

FOLLOWING closely upon the revised list of herbaceous plants which was issued last June, a welcome addition to the literature originating from the Royal Botanic Gardens, Kew, is furnished by a new edition of the "Hand List of Trees and Shrubs Grown in the Arboretum." This does not include the Coniferæ, which are undergoing revision. Previously produced in two parts, the present list includes in the single volume the monocotyledons and all the dicotyledons to the number of about four thousand five hundred.

THE second fasciculus of the supplement to the "Index Kewensis" has been presented by M. T. Durand and Mr. B. Daydon Jackson, having been published, like the first, at Brussels. Included are genera from Cymbidium to Iriha, either new genera or those to which new species or synonyms were added during the decade commencing with the year 1886. Cyripedium and Dendrobium are considerably enlarged, chiefly owing to the enumeration of new hybrids; the additions to Hieracium are principally European, which is accounted for by the fact that during the era many investigators, notably Hanbury in Britain, were working out the variations of this polymorphic genus throughout the continent.

THE development of a somewhat rare Gasteromycete is described by Mr. J. R. Johnston under the name of *Cauloglossum transversarium*. A central columella runs throughout, the gleba contains chambers which are lined with basidia, and

the periderm is very thin and ruptures irregularly, exposing the glebal folds. *Cauloglossum* may be regarded as a synonym for *Podaxon*, hence the author proposes the name *Rhopalogaster* and favours affinity with the *Hysterangiaceæ*. The paper appears in the *Proceedings* of the American Academy of Arts and Sciences, from which source comes also a fifth list of new species of *Laboulbeniaceæ*, with diagnoses contributed by Prof. Roland Thaxter. These are forms which were found growing on the bodies or appendages of insects.

ONE of the last reports issued by the Weather Bureau in Manila describes "the seismic and volcanic centres of the Philippine Archipelago." The author of this report, M. Sad-dera Masó, S.J., divides the Archipelago into four districts or sections, and for each of these gives, in chronological order with short descriptions, lists of large earthquakes and volcanic eruptions. In looking over these records, the earliest of which refers to the year 1599, it is interesting to note the instances in which these two phenomena have agreed in time. The relative frequency of earthquakes in the Archipelago is shown by a coloured map, by tables and by curves. Since 1880, maxima occurred in 1881 and 1897, with a minimum in 1886. The distribution of earthquakes in the rainy season (June to October), the dry cold season (November to February) and the dry hot season (March to May) are in the ratios 100:73:53. Other tables and diagrams refer to distribution of shocks according to years, months and hours, but it cannot be said that they show any marked periodicities.

MESSRS. A. E. STALEY AND CO. (35 Aldermanbury, E.C.) have sent us a small pamphlet entitled "Mahomet and the Mountain, a Modern Miracle," which they have just published. The text is devoted to the elucidation of many points connected with the use of the telephotographic lens, and should be found serviceable to those who are commencing the use of this form of lens. Several typical illustrations are inserted. Those who wish to read this booklet can obtain one from the publishers post free on application.

THE twentieth volume of the *Geographical Journal*, containing the monthly issues from July to December, 1902, is now available. It commences with the address delivered by the president, Sir Clements Markham, F.R.S., to the Royal Geographical Society at the anniversary meeting. In addition to numerous other articles of interest, the volume contains a summary of the results of his latest journey in Central Asia by Dr. Sven Hedin; contributions by Mr. Ellsworth Huntington, on a journey through the great cañon of the Euphrates River; by Mr. Oscar Neumann, on an expedition from the Somali coast through southern Ethiopia; and by Dr. M. A. Stein, on a journey of geographical and archæological exploration in Chinese Turkestan. Interesting particulars are also to be found concerning the departure of the *Morning* in search of the *Discovery* in connection with the National Antarctic expedition. The liberal supply of illustrations, charts and maps make with the papers an instructive and interesting record of geographical work.

THE additions to the Zoological Society's Gardens during the past week include a Binturong (*Arctitis binturong*) from the Malay Peninsula, presented by Mr. M. A. Hawes; an Indian Crow (*Corvus splendens*) from India, presented by Mr. D. Asbury; an American Golden Plover (*Charadrius americanus*), captured at sea, presented by Mr. G. Carrick; a Blackbird, var. (*Turdus merula*), a Long Thrush (*Turdus musicus*) British, presented by Miss Alice Ellis; a Coquerel's Mouse Lemur (*Chirogaleus coquereli*) from Madagascar, six Himalayan Monauls (*Lophophorus impeyanus*) from the Himalayas, two Brush Turkeys (*Talegalla lathamii*) from Australia, three South Island Robins (*Mira albigrons*) from New Zealand, deposited.